

**POTENTIAL ENVIRONMENTAL HAZARDS  
ON  
INACTIVE / ABANDONED MINE LANDS,  
  
CORONADO NATIONAL FOREST,  
SOUTHEAST ARIZONA**

**ANALYSIS OF  
THE USBM COMPREHENSIVE MINE AND PROSPECT INVENTORY  
AND MINERAL RESOURCE ASSESSMENT IN  
CORONADO NATIONAL FOREST**



**U.S. DEPARTMENT OF THE INTERIOR  
BUREAU OF MINES**

**OCTOBER 1993**

## CONTENTS

	<u>page</u>
INTRODUCTION .....	1
METHODOLOGY FOR DETERMINING POTENTIAL ENVIRONMENTAL HAZARDS AND POTENTIAL HUMAN HAZARDS .....	2
Identification of minimum thresholds for potential hazards .....	2
Determining the potential environmental hazard (EH) value .....	4
Determining the potential human hazard (HH) value .....	6
RESULTS .....	6

## TABLES

Text table 1.--Minimum threshold criteria, potential environmental/human hazards .....	3
Text table 2.--Summary of Potential Environmental Hazard ratings by USBM, Coronado National Forest .....	7

## APPENDIXES

Appendix A.--Composite list, Forest-wide, of IAMLS for which EH values were assigned; all are ranked by EH value .....	A1
Appendix B.--Tables of numerical values for specific characteristics on IAMLS .....	B1
Appendix C.--Abandoned mine land inventory and investigations data entry form .....	C1
Appendix D.--List of USBM mine inventory/mineral resource evaluation reports, Coronado National Forest .....	D1

## ***AND BOUND AS TWO SEPARATE VOLUMES:***

Appendix E.--Documentation for derivation of EH values and HH values:  Vol. 1, Chiricahua, Dragoon, Galiuro, Huachuca, Patagonia (& Canelo Hills), Peloncillo, Pinaleno, Santa Catalina-Rincon .....	E1
Vol. 2, Santa Rita, Santa Teresa, Tumacacori (& Atascosa, Pajarito, San Luis), Whetstone, Winchester .....	E387

**POTENTIAL ENVIRONMENTAL HAZARDS ON  
INACTIVE/ABANDONED MINE LANDS,  
CORONADO NATIONAL FOREST, SOUTHEAST ARIZONA**

by  
Staff, U.S. Bureau of Mines

---

**INTRODUCTION**

In 1993<sup>1</sup>, U.S. Bureau of Mines (USBM) staff from the Branch of Resource Evaluation, Intermountain Field Operations Center (IFOC), Denver, CO, evaluated the potential for environmental and human hazards on inactive/abandoned mine land sites (IAMLS) in Coronado National Forest, southeast Arizona. Potential hazard identification is based on information compiled during a USBM comprehensive inventory of mine, mill, and prospect sites in Coronado National Forest<sup>2</sup>, which was conducted, with field work and mapping, from 1988 through 1992.

USBM's mine, mill, and prospect inventory was originally designed to assess mineral resources present in Coronado National Forest, and to determine their likelihood of future development. Recent Forest Service interest in discerning the status of hazards on their IAMLS created additional utility for the USBM inventory data. These data were processed further by USBM mineral-resource professionals to determine which IAMLS on public lands in the Forest exhibited potential for environmental or human hazards. Environmental hazards pertain primarily to the release of toxic materials into the environment. Human hazards pertain primarily to *physical* conditions that could pose a risk to public safety.

Hazard potentials were calculated, using a relative numerical scale developed by USBM, and IAMLS were ranked, Forest-wide, according to potential for environmental hazards (see composite ranking list, appendix A). This contribution is of particular value because it utilizes USBM first-hand knowledge derived during field examinations of hundreds of IAMLS, and will minimize Forest Service research and field costs to identify, locate, and quantify potential hazards at IAMLS within the Forest. Through use of the site rankings, subsequent Forest Service efforts can be

---

<sup>1</sup> Hazard evaluation conducted during July, August, and September of 1993.

<sup>2</sup> Inventory undertaken with the authority of a January 1987 Interagency Agreement between the USBM and U.S. Department of Agriculture, Forest Service, among others.

directed towards priority IAMLS, some of which may warrant additional field visits for a detailed environmental site characterization (e.g., measuring effluent water flow, pH, conductivity; detailing waste dump mineralogy). Detailed environmental site characterizations allow assessment of the need for remediation at a site, if any, and can be utilized in the design of remediation approaches. Under some circumstances, the remediation of environmental hazards can be a long-term, high-cost undertaking. In contrast, remediation of human (physical) hazards is often a short-term engineering task, which can be of relatively low cost. Consequently, results of this study were used to rank IAMLS by potential for environmental hazards, rather than potential for human hazards. *Mines, mills, and prospects on private land, including mineral patents, were not assessed for potential environmental or human hazards.*

## **METHODOLOGY FOR DETERMINING POTENTIAL ENVIRONMENTAL HAZARDS AND POTENTIAL HUMAN HAZARDS**

Methodology used to determine the potential for environmental and human hazards at IAMLS in the Coronado National Forest was based largely on USBM's Abandoned Mine Land Inventory and Hazard Evaluation Handbook (July 1993 draft version). That handbook utilizes the concept that various elements, materials, and conditions observed at IAMLS can be assigned relative numerical values (see tables in appendix B), and that a higher numerical value indicates a higher potential for environmental or safety risks at the site. Specific numerical values reflect professional USBM opinions concerning the degree to which a characteristic will relate to promoting potential hazards. Characteristics relating to an IAMLS's type, size, status, commodity, milling method (if any), and the acid generating potential of its waste rock or open excavations are those assigned specific numerical values. These numerical values are used to derive two overall ratings, representing: 1) potential environmental hazard (EH) for the IAMLS, and 2) potential human hazard (HH) for the IAMLS. First, however, a screening of characteristics of all IAMLS was done to determine whether or not the analysis resulting in assignation of potential hazard values was warranted. The screening process is described below.

### **Identification of minimum thresholds for potential hazards**

Minimum thresholds that concern potential environmental hazards and potential human hazards were set specifically for this processing of Coronado National Forest data. A screening of all IAMLS was done to determine if the minimum thresholds were

met. For IAMLS at which the minimum thresholds were met, further analysis was conducted, which resulted in assignation of potential hazard values. Data concerning IAMLS on public land in Coronado National Forest<sup>3</sup> were examined to determine whether the IAMLS exceeded minimum thresholds for potential environmental or human hazards, considered to occur if any of the elements, materials, or conditions in text table 1 (see below) were applicable to any workings, buildings, stockpiles, etc., at a mine, mill, or group of prospects. If none of these items were applicable to a particular IAMLS, it was eliminated from further analysis, and no EH or HH values were assigned to it.

**Text table 1.—*Minimum threshold criteria, potential environmental/human hazards.***

<u>Minimum threshold criteria, potential environmental hazards</u>	
<b>KNOWN MINERAL PRODUCTION</b>	
<b>SPECIFIC ELEMENTS</b>	
* Presence of the elements copper (Cu), lead (Pb), or zinc (Zn) in amounts of 200 ppm (parts per million), or more (100 ppm equals 0.01%). Presence of the elements arsenic (As) or cadmium (Cd) in amounts of 100 ppm or more, or presence of any amount of mercury. All rock samples collected by USBM were tested for mercury. One ppm Hg is lowest amount that could be detected under the testing method used.	
<b>A MILL PRESENT</b>	
<b>WATER CONDITIONS</b>	
* Effluent water from an adit or other mine working. Evidence of periodic flooding by groundwater: standing water in an adit; a waterline inside an adit; mud (including dried mud) inside an adit.	
<b>WASTE ROCK</b>	
* A mine dump larger than 2,000 st (short tons) <sup>4</sup> AND any of the following minerals/compounds encountered fairly commonly on any part of the mine dump: pyrite, arsenopyrite, chalcopyrite, marcasite, pyrrhotite, galena, sphalerite, stibnite, limonite, forms of iron oxide, other sulfide minerals.	

<sup>3</sup> Data were compiled in 13 mine inventory/mineral resource assessment reports, which are listed in appendix D. Some of the reports are currently in press, and others are still under preparation.

<sup>4</sup> Equivalent to about 900 yd<sup>3</sup> of broken rock, or roughly a pile of broken rock 15-ft by 60-ft and more than 10-ft-thick.

**Text table 1.--Minimum threshold criteria, potential environmental/human hazards--contin.**

<u>Minimum threshold criteria, potential human hazards</u>
<b>DEEP (NEAR)VERTICAL EXCAVATIONS</b>
* Presence of an open shaft, stope, etc., that is more than 20-ft-deep. Presence of an open adit <sup>5</sup> with a winze [vertical excavation into the adit sill (or floor)] more than 20-ft-deep.
<b>HAZARDOUS ATMOSPHERE</b>
* Presence of an open adit with known or suspected "bad air" <sup>6</sup> .
<b>POTENTIAL FALLING ROCK</b>
* Presence of an open adit with bad rock conditions resulting from a variety of sources/conditions, such as overblasting, mine collapse, weathering, water movement, intersection of a fault zone in the mine, or deterioration of supports installed by miners.
<b>SUBSIDENCE</b>
* Presence of active or potential surface subsidence as a result of mine collapse.
<b>COLLAPSING STRUCTURES</b>
* Headframes, ore bins, mine/mill buildings.

If any item in text table 1 (above) was applicable to any working, structure, or condition at a mine, mill, or group of prospects, then further analysis was conducted, which resulted in calculation of EH and HH values for the group of workings. Those calculation methodologies are described below.

#### Determining the potential environmental hazard (EH) value

Sites that met minimum threshold criteria for potential environmental hazards underwent further analysis, resulting in assignation of a numerical potential environmental hazard value (EH) to the sites. These EH ratings were derived using the detailed AML<sup>7</sup> Inventory and Investigation Data Entry Form (appendix C), which is a tabulation of numerous characteristics of specific IAMLS. Upon completion of the inventory and investigation form, numerical values from the tables in appendix B were

---

<sup>5</sup> A mine adit is an underground excavation of several ft to several thousands of ft in length that is usually an essentially horizontal working.

<sup>6</sup> Inactive mines can have a variety of hazards that are considered generally as "bad air", e.g., depleted oxygen content; increased levels of carbon monoxide, carbon dioxide; presence of methane, radon gas, oxides of sulfur or nitrogen.

<sup>7</sup> Abandoned Mine Land.

utilized. Numerical values were assigned to the IAMLS in categories of mineral commodity (table E-1), mine status (table E-2), mine type (table E-3), mine size (table E-4), mill method (table E-5), and acid generating potential (tables E-6 and E-7). Numerical values were combined by the following formula.

$$\text{Potential Environmental Hazard (EH)} = (A) X (B) X (C) X (D) X (E) X (F).$$

A = Commodity. The *highest* numerical value applicable from table E-1, environmental column. "Commodity" at a site is that produced historically, or noted in analyses where no production is documented.  
B = Status. The *highest* numerical value applicable from table E-2.  
C = Type. The *highest* numerical value applicable from table E-3.  
D = Size. The *highest* numerical value applicable from table E-4.  
E = Mill method. The *highest* numerical value applicable from table E-5.  
F = Acid generating potential. A "yes" response to table E-6 applies if any of the indicator minerals in table E-7 were checked, **AND** no acid neutralizing host rocks are present (see page 2 of the inventory and investigation form, appendix C). Otherwise a "no" response to table E-6 is warranted. The "yes" or "no" translate into numerical values in table E-6. Note that rainfall is assumed to be the same throughout the areas of the Coronado National Forest that were studied.

The computed EH value represents the *potential* for the IAMLS to have environmental hazards which may warrant some form of remediation. All IAMLS that underwent this analysis were ranked by EH in a composite, Forest-wide list that is offered in appendix A. EH rankings are further categorized into three priority levels:

Category "A" IAMLS (EH > 20) definitely warrant additional field examination and detailed environmental site characterization.

Category "B" IAMLS (EH > 7 and < 20) probably warrant additional field examination and detailed environmental site characterization.

Category "C" IAMLS (EH < 7) do not warrant additional field examination and detailed environmental site characterization.

The purpose of the additional field examinations and detailed environmental site characterizations would be to obtain data to verify that an environmental problem exists and to design remediation for the site. Locations of IAMLS for which an EH value has been assigned are on plate 1 (in pocket), and color-coded according to whether they fall in categories A, B, or C. Documentation for derivation of all EH values is offered in appendix E (bound separately from this report in two volumes due to its large size). Appendix E copies have been archived with the Coronado Supervisor's Office, Tucson, AZ, the Forest Service's Arizona Zone Office, Phoenix,

AZ, the Forest Service Regional Office, Albuquerque, NM, and the Coronado's District Ranger Offices in Tucson, Safford, Nogales, Sierra Vista, and Douglas, AZ.

#### Determining the potential human hazard (HH) value

In addition to rating potential environmental hazards, USBM personnel also rated potential human hazards on Coronado National Forest IAMLS. A potential human hazard (HH) rating was calculated for IAMLS at which minimum threshold criteria were met (text table 1). The derivation of individual HH values is documented in appendix E. IAMLS in the National Forest were not ranked according to relative potential human hazard, for reasons explained on page 2. The HH values were calculated by a formula similar to that used to calculate the EH values:

$$\text{Potential Human Hazard (HH)} = (A) X (B) X (C) X (D) X (E) X (F).$$

A = Commodity. The *highest* numerical value applicable from table E-1, **HUMAN** column. "Commodity" at a site is that produced historically, or noted in analyses, where no production is documented.

B = Status. The *highest* numerical value applicable from table E-2.

C = Type. The *highest* numerical value applicable from table E-3.

D = Size. The *highest* numerical value applicable from table E-4.

E = Mill method. The *highest* numerical value applicable from table E-5.

F = Access. The *highest* numerical value applicable from table 9. This table was derived specifically for the work in the Coronado. The topic is not addressed in the USBM Abandoned Mine Land Inventory and Hazard Evaluation Handbook (July 1993 draft version).

## RESULTS

Text table 2 (below) summarizes the USBM results of rating potential environmental hazards on IAMLS in Coronado National Forest. The complete, composite list of rated IAMLS is in appendix A. Documentation for the derivation of each rating in the composite list is in appendix E. Category "A" IAMLS are potentially the most problematic, and are those on which the Forest Service may want to focus particular attention.

**Text table 2.--Summary of Potential Environmental Hazard ratings by USBM,  
Coronado National Forest.**

Forest Unit Name (Mountain Range)	No. of IAMLS rated with EH value	No. of Category A IAMLS	No. of Category B IAMLS	No. of Category C IAMLS
Chiricahua-Pedregosa	29	1	24	4
Dragoon	27	2	22	3
Galiuro	5	0	5	0
Huachuca	32	9	18	5
Patagonia (includes also Canelo Hills)	33	23	9	1
Peloncillo	1	0	1	0
Pinaleno-Greasewood	10	0	10	0
Santa Catalina-Rincon	48	10	34	4
Santa Rita	139	49	89	1
Santa Teresa	5	0	5	0
Tumacacori (includes also Atascosa, Pajarito, and San Luis Mountains)	112	32	74	6
Whetstone	19	4	12	3
Winchester	0	0	0	0

## **APPENDIX A**

**COMPOSITE LIST, FOREST-WIDE, OF IAMLS FOR WHICH EH  
VALUES WERE ASSIGNED; ALL ARE RANKED BY EH VALUE**

Unit (Mountain Range)	IAMLS name	USBM sample #	Lat.	Long.	EH	EH category
-----------------------	------------	---------------	------	-------	----	-------------

IAMLS ordered by EH (high to low), and then HH (high to low).

Canelo Hills-Patagonia Mountains	Flux Mine	PA127-145	N312919	W1104512	54.4	A
Dragoon	Middlemarch Mine	DR 276-283	N315252	W1095653	53.2	A
Santa Rita	Gringo Mine area	SR749-775	N313420	W1104645	43.6	A
Tumacacori	Blue Ribbon & Gold Hill Group	T223 - T229	N312835	W1111714	41.5	A
Tumacacori	Oro Blanco	T599 - T609	N312514	W1111441	41.5	A
Santa Rita	Mansfield Group	SR804, 805	N313644	W1104830	41.5	A
Tumacacori	Payoff and vicinity	T116 - T121	N313219	W1112058	41.5	A
Canelo Hills-Patagonia Mountains	Trench Camp Mineralized Area	PA289	N312810	W1104355	41.5	A
Tumacacori	Ajax and vicinity	T67 - T106	N313228	W1112016	41.5	A
Chiricahua-Pedregosa Mtns.	Hilltop Mine	CH 28-32	N315907	W1091721	40.3	A
Santa Rita	Glove Mine	SR390	N313932	W1105648	40.3	A
Santa Catalina-Rincon	Taraldson claim	SC136-SC138	N323339	W1104450	24.9	A
Dragoon	Seneca Mine	DR 121-129	N315754	W1095857	20.8	A
Tumacacori	Idaho Mine Group	T301 - T314	N312753	W1111428	20.7	A
Tumacacori	Austerlitz vicinity	T241 - T276	N312801	W1111604	20.7	A
Canelo Hills-Patagonia Mountains	Christmas Gift Mine	PA90-105	N313131	W1104302	20.7	A
Santa Rita	Philadelphia Mine	SR877-881	N313815	W1104800	20.7	A
Huachuca	Wakefield	HU258-HU269	N312416	W1102053	20.7	A
Huachuca	Tungsten Reef	HU092-HU097	N312536	W1101717	20.7	A
Santa Catalina-Rincon	Carolina Moon Group	SC100-SC107	N323409	W1104414	20.7	A
Santa Catalina-Rincon	Highjinks	SC95-SC97	N323412	W1104417	20.7	A
Santa Rita	Blue Lead Mine	SR677-685	N313416	W1104850	20.7	A
Santa Rita	Mohawk Mine	SR650-669	N313434	W1105013	20.7	A
Santa Rita	Alto Mine Group	SR567-590	N313644	W1105140	20.7	A
Santa Rita	Apache Mine	SR555, 556	N313708	W1105145	20.7	A
Santa Rita	San Ramon Mine	SR546-554	N313704	W1105130	20.7	A
Santa Rita	Silver Sally	SR517	N313732	W1105245	20.7	A
Santa Rita	Arizona-Pittsburg Mine	SR510-514	N313754	W1105142	20.7	A
Santa Rita	Compadre Mine Group	SR486-490	N313820	W1105235	20.7	A
Santa Rita	Tia Juana Mine	SR457-473	N314010	W1105300	20.7	A
Santa Catalina-Rincon	Burney Group	SC62-SC66	N323303	W1104728	20.7	A
Canelo Hills-Patagonia Mountains	Aztec Mine Group	PA117-126	N313037	W1104455	20.7	A
Canelo Hills-Patagonia Mountains	Denver Mine	PA479-489	N312703	W1104656	20.7	A
Canelo Hills-Patagonia Mountains	Ventura Mine	PA430-478	N312726	W1104550	20.7	A
Canelo Hills-Patagonia Mountains	Lookout Mine	PA346-367	N312826	W1104717	20.7	A
Canelo Hills-Patagonia Mountains	Thunder Mine	PA169-288	N312639	W1104454	20.7	A
Whetstone	Chadwick	WH37-WH49	N315011	W1102154	20.7	A
Santa Rita	Gold Fish Mine	SR118-121	N314823	W1104558	20.7	A
Whetstone	Evening Star	WH31-WH36	N315014	W1102213	20.7	A
Canelo Hills-Patagonia Mountains	Tres de Mayo Mineralized Area	PA490-506	N312645	W1104758	20.7	A

Unit (Mountain Range)	IAMLS name	USBM sample #	Lat.	Long.	EH	EH category
Santa Catalina-Rincon	Burney Group	SC47-SC50	N323320	W1104734	20.7	A
Santa Rita	Carrie Nation Mine	SR286-294	N314150	W1105225	20.7	A
Santa Rita	Wisconsin Mine	SR131-135	N314655	W1104633	20.7	A
Santa Rita	Lead Prospect	SR296	N314201	W1105249	20.7	A
Santa Rita	Mountain King Mine area	SR143-147	N314625	W1104708	20.7	A
Santa Rita	Yuba Mine	SR159	N314540	W1104659	20.7	A
Santa Rita	Quebec Mine	SR170-172	N314532	W1104633	20.7	A
Santa Rita	Morning Star Mine	SR202-204	N314538	W1104543	20.7	A
Santa Rita	Rock Candy Mountain Mine area	SR259-270	N314245	W1104515	20.7	A
Santa Rita	Comstock Group	SR193-198	N314528	W1104551	20.7	A
Santa Rita	Dixie Mine	SR920-925	N313745	W1104940	20.7	A
Santa Rita	Summit Mine	SR148-150	N314552	W1104754	20.7	A
Santa Catalina-Rincon	Burney Group	SC33-SC38	N323309	W1104755	20.7	A
Santa Catalina-Rincon	Burney Group	SC31, SC32	N323307	W1104757	20.7	A
Canelo Hills-Patagonia Mountains	O'Mara Mine	PA507-514	N312552	W1104549	20.7	A
Canelo Hills-Patagonia Mountains	Paymaster Mine	PA515-529	N312448	W1104428	20.7	A
Santa Rita	Elephant Head Group	SR315...355	N314238	W1105520	20.7	A
Canelo Hills-Patagonia Mountains	Winifred Mine	PA539-541	N312407	W1104258	20.7	A
Santa Rita	Vulcan Mine Group	SR427-442	N313932	W1105518	20.7	A
Canelo Hills-Patagonia Mountains	Jackalo Mine	PA564-601	N312415	W1104448	20.7	A
Canelo Hills-Patagonia Mountains	Shamrock Mine	PA603-641	N312419	W1104657	20.7	A
Canelo Hills-Patagonia Mountains	Edna Group	PA708-718	N312216	W1104610	20.7	A
Canelo Hills-Patagonia Mountains	Buena Vista Mine	PA642-707	N312245	W1104606	20.7	A
Canelo Hills-Patagonia Mountains	Olive Mine	PA534-535	N312507	W1104213	20.7	A
Santa Rita	Frijole Mine	SR64-79	N315100	W1104609	20.7	A
Santa Catalina-Rincon	Burney Group	SC9-16, 24-30	N323302	W1104756	20.7	A
Tumacacori	Tres Amigos Lead	T728 - T735	N312452	W1111452	20.7	A
Tumacacori	Ostrich	T197 - T202	N312933	W1111837	20.7	A
Tumacacori	Cramer	T611 - T615	N312517	W1111407	20.7	A
Tumacacori	Margarita Mine Group	T399 - T418	N312640	W1111520	20.7	A
Tumacacori	Horn Gold	T320, T321	N312705	W1111621	20.7	A
Tumacacori	Grubstake	T675 - T687	N312443	W1111522	20.7	A
Tumacacori	Oro Fino	T702 - T704	N312419	W1111503	20.7	A
Tumacacori	Tres Amigos	T622 - T674	N312457	W1111501	20.7	A
Tumacacori	Smuggler	T570 - T580	N312506	W1111505	20.7	A
Tumacacori	San Juan	T656 - T658	N312504	W1111503	20.7	A
Tumacacori	Sorrel Top	T659 - T661	N312501	W1111508	20.7	A
Tumacacori	Andrews	T278 - T291	N312745	W1111552	20.7	A
Tumacacori	Missouri	T315 - T318	N312708	W1111738	20.7	A
Tumacacori	Lucky Shot Mine Group	T473 - T483	N312647	W1111433	20.7	A
Tumacacori	Rubiana Mine Group	T331 - T337	N312922	W1111526	20.7	A
Tumacacori	Penasco and vicinity	T880 - T899	N312251	W1110924	20.7	A
Huachuca	Arrow Group	HU011	N312906	W1102509	20.7	A
Tumacacori	Conejo and vicinity	T107 - T115	N313223	W1112003	20.7	A

Unit (Mountain Range)	IMLS name	USBM sample #	Lat.	Long.	EH	EH category
Tumacacori	Sunset and vicinity	T822 - T842	N312231	W1110551	20.7	A
Tumacacori	Big Steve	T843 - T845	N312230	W1110525	20.7	A
Tumacacori	St. Patrick	T786 - T815	N312231	W1110557	20.7	A
Tumacacori	White Oaks	T846 - T855	N312230	W1110508	20.7	A
Tumacacori	Dos Amigos	T709 - T720	N312500	W1111433	20.7	A
Santa Catalina-Rincon	Golden Eagle	SC164, SC165	N323318	W1104248	20.7	A
Santa Rita	Bull Springs Mine	SR500	N313815	W1105411	20.7	A
Santa Rita	Victor Mine	SR591-609	N313608	W1104945	20.7	A
Canelo Hills-Patagonia Mountains	Haist Mine	PA530-533	N312510	W1104307	20.7	A
Santa Rita	FS-1	SR702-706	N313332	W1104635	20.7	A
Santa Rita	Herr Mine	SR451, 452	N314018	W1105415	20.7	B
Santa Rita	Jersey Girl	SR519, 520	N313719	W1105220	20.7	A
Tumacacori	Last Chance	T353 - T359	N312709	W1111439	20.7	A
Tumacacori	Brown Bird Mine Group	T343 - T347	N312710	W1111524	20.7	A
Huachuca	Eureka	HU024, HU025	N312544	W1102246	20.7	A
Tumacacori	Black Peak	T373 - T377	N312643	W1111730	20.7	A
Huachuca	Armistace	HU118, HU119	N312430	W1101545	20.7	A
Canelo Hills-Patagonia Mountains	Benton Mine	PA753-756	N312027	W1104139	20.7	A
Santa Rita	Jackson Group	SR274-277	N314536	W1105128	20.7	A
Santa Rita	Sweet Water Group	SR255-258	N314240	W1104725	20.7	A
Santa Rita	Hosey Mine area	SR938-946	N313740	W1105040	20.7	A
Santa Rita	Lexington Mine	SR122-124	N314814	W1104609	20.7	A
Santa Rita	Treasure Vault Mine	SR306, 307	N314200	W1105328	20.7	A
Santa Rita	Santa Rita Mines	SR358-360	N314152	W1105539	20.7	A
Santa Rita	Connecticut Mine	SR478-485	N313923	W1105207	20.7	A
Santa Rita	Extension Prospect	SR418-426	N313950	W1105604	20.7	A
Santa Rita	Braathern	SR446-450	N314040	W1105420	20.7	A
Santa Rita	Little Shot Mine	SR285	N314148	W1105135	20.7	A
Santa Rita	Hancock Mine	SR139	N314629	W1104624	20.7	A
Canelo Hills-Patagonia Mountains	Sansimon Mine	PA5-15	N313207	W1104147	20.7	A
Santa Catalina-Rincon	Pretty Fair	SC51, SC52	N323222	W1104701	20.7	A
Canelo Hills-Patagonia Mountains	Lead Queen	PA146-168	N312901	W1104308	20.7	A
Santa Rita	Unnamed workings	SR686-699	N313350	W1104652	20.7	A
Huachuca	Lucky Strike	HU060, HU061	N312749	W1101901	20.7	A
Tumacacori	Brick	T297 - T328	N312745	W1111514	20.7	A
Huachuca	Copper Glance	HU037-HU044	N312516	W1102129	20.7	A
Whetstone	Two Peaks and vicinity	WH88-WH96	N314605	W1102542	20.7	A
Whetstone	Bluestone	WH23-WH27	N315039	W1102206	20.7	A
Huachuca	Tako #9	HU148-HU187	N312214	W1101739	20.7	A
Canelo Hills-Patagonia Mountains	New York	PA18-66	N313135	W1103642	20.7	A
Canelo Hills-Patagonia Mountains	La Plata Mine	PA70-89	N313127	W1103532	20.7	A
Huachuca	Morgan	HU130-HU133	N312205	W1101528	20.7	A
Santa Rita	Merry Widow	SR516	N313738	W1105225	20.7	A
Santa Rita	Happy Jack Mine	SR788-794	N313603	W1104912	20.7	A

Unit (Mountain Range)	IAMLS name	USBM sample #	Lat.	Long.	EH	EH category
Santa Rita	Helena Mine and vicinity	SR9-23	N315230	W1104230	20.7	A
Santa Rita	Last Chance	SR776-787	N313605	W1104825	20.7	A
Dragoon	San Juan Mine	DR 195-222	N312259	W1095857	20.2	A
Chiricahua-Pedregosa Mtns.	Unnamed adit, decline	CH 60-64	N315836	W1091653	18.7	B
Pinaleno-Greasewood Mtns.	Black Beauty prospect	PI 14-20	N324119	W1100330	17.3	B
Dragoon	Standard Tungsten	DR 300-315	N315246	W1095722	17.3	B
Chiricahua-Pedregosa Mtns.	Blumberg Canyon adit	CH 5-10	N315942	W1091737	17.3	B
Dragoon	Festerling Mine	DR 316-326	N315135	W1095642	17.3	B
Dragoon	Moonlight Mine	DR 355-363	N315103	W1095631	17.3	B
Chiricahua-Pedregosa Mtns.	Silver Prince Mine	CH 65-72	N315815	W1091750	17.3	B
Dragoon	Cobre Loma Mine	DR 246-250	N315328	W1095747	17.3	B
Dragoon	Buena Vista Mine	DR 80-91	N315806	W1100113	17.3	B
Dragoon	Naoe Workings	DR 111-120	N315748	W1100009	17.3	B
Santa Catalina-Rincon	Old Maudina	SC160-SC162	N323306	W1104338	17.3	B
Huachuca	Power claim	HU098-HU109	N312444	W1101712	17.3	B
Huachuca	Cave	HU198-HU211	N312257	W1101921	17.3	B
Dragoon	Muheim Mine	DR 226-239	N315302	W1095837	17.3	B
Whetstone	Windmill Group	WH9, WH 10	N315306	W1102316	17.3	B
Santa Rita	Golden Gate Mine	SR126-130	N314807	W1104538	17.3	B
Canelo Hills-Patagonia Mountains	Hardshell Mineralized Area	PA340-344	N312702	W1104254	17.3	B
Santa Rita	Snyder Mine	SR229-249	N314358	W1104542	17.3	B
Santa Rita	Bonanza Mine	SR363...382	N314130	W1105648	17.3	B
Santa Rita	Montosa Mine	SR405-417	N314005	W1105600	17.3	B
Santa Rita	Santa Rita No. 26	SR112-114	N314944	W1104535	17.3	B
Tumacacori	Morning	T776 - T783	N312237	W1110532	17.3	B
Chiricahua-Pedregosa Mtns.	Unnamed adit complex	CH 93-122	N315713	W1091454	17.3	B
Huachuca	James Group	HU050-HU059	N312707	W1102004	17.3	B
Chiricahua-Pedregosa Mtns.	El Tigre Mine	CH 73-75	N315606	W1091706	17.3	B
Huachuca	Samson claim	HU188, HU189	N312210	W1101735	17.3	B
Huachuca	Lutz Tunnel	HU138-HU147	N312301	W1101712	17.3	B
Huachuca	Western Tungsten	HU228-HU232	N312405	W1101927	17.3	B
Chiricahua-Pedregosa Mtns.	Silver Hill Mine	CH 163-176	N315641	W1091323	17.3	B
Chiricahua-Pedregosa Mtns.	Columbia Mine	CH 153-160	N315702	W1091312	17.3	B
Galiuro	Powers Mine	NONE	N323533	W1092038	17.3	B
Galiuro	Long Tom Mine	NONE	N323436	W1102012	17.3	B
Santa Rita	Unnamed workings	SR518	N313728	W1105238	15.6	B
Santa Rita	Armada Mine	SR852-868	N313740	W1104800	15.6	B
Santa Rita	Ultimo Mine	SR871-876	N313755	W1104755	15.6	B
Santa Rita	Little Joker Mine	SR889-898	N313827	W1104808	15.6	B
Santa Rita	St. Louis Mine	SR882-888	N313822	W1104805	15.6	B
Santa Rita	Double Header Mine	SR869-870	N313748	W1104800	15.6	B
Huachuca	Baumkirchner	HU120-HU125	N312400	W1101449	15.6	B
Tumacacori	Unnamed workings	T589 - T598	N312537	W1111424	15.6	B
Tumacacori	Unnamed adit	T691, T692	N312437	W1111509	15.6	B

Unit (Mountain Range)	IAMLS name	USBM sample #	Lat.	Long.	EH	EH category
Tumacacori	Unnamed adit	T324	N312736	W1111550	15.6	B
Tumacacori	Unnamed workings	T636 - T648	N312443	W1111530	15.6	B
Tumacacori	Goldsmith	T140 - T145	N313150	W1112024	15.6	B
Tumacacori	Unnamed workings	T696 - T701	N312426	W1111508	15.6	B
Tumacacori	Deer	T49 - T66	N313239	W1112040	15.6	B
Santa Catalina-Rincon	Mary West	SC189-SC197	N323156	W1104434	15.6	B
Santa Catalina-Rincon	Unnamed adits	SC144-SC156	N323330	W1104406	15.6	B
Santa Catalina-Rincon	G O P	SC166-SC173	N323256	W1104309	15.6	B
Santa Catalina-Rincon	Unnamed workings	SC205-SC211	N323057	W1104242	15.6	B
Tumacacori	Silver Top Prospects	T360 - T372	N312659	W1111408	15.6	B
Santa Catalina-Rincon	American Flag	SC121-SC123	N323441	W1104319	15.6	B
Santa Catalina-Rincon	Copper Cliff	SC139, SC140	N323346	W1104402	15.6	B
Santa Rita	Unnamed workings	SR610-619	N313542	W1105020	15.6	B
Santa Rita	Unnamed workings	SR521, 522	N313654	W1105227	15.6	B
Santa Rita	Grey Fox	SR491, 492	N313835	W1105222	15.6	B
Santa Rita	Silver King Mine	SR474-477	N313935	W1105148	15.6	B
Santa Rita	R&R Prospect	SR453-456	N304022	W1105325	15.6	B
Santa Rita	Unnamed workings	SR501	N313755	W1105250	15.6	B
Santa Rita	BJ No. 1 Claim	SR443	N314035	W1105502	15.6	B
Santa Rita	Mineral West	SR523	N313655	W1105218	15.6	B
Santa Rita	Ramon Prospect	SR541-545	N313712	W1105128	15.6	B
Santa Rita	Unnamed working	SR444, 445	N314055	W1105443	15.6	B
Santa Rita	Unnamed workings	SR494-499	N313818	W1105310	15.6	B
Santa Rita	Josephine	SR493	N313824	W1105253	15.6	B
Tumacacori	Unnamed adit	T426 - T436	N312632	W1111521	15.6	B
Tumacacori	Unnamed workings	T170 - T174	N313016	W1111937	15.6	B
Santa Rita	Ellen Della and Vansuella prospects	SR707-715	N313334	W1104722	15.6	B
Santa Rita	Cowboys Dream Mine area	SR620-649	N313451	W1104845	15.6	B
Huachuca	Unnamed workings	HU028-HU036	N312523	W1102140	15.6	B
Santa Rita	Unnamed workings	SR700, 701	N313307	W1104720	15.6	A
Tumacacori	Unnamed adit	T445 - T449	N312621	W1111518	15.6	B
Santa Rita	Three Star Prospect	SR515	N313737	W1105200	15.5	B
Santa Catalina-Rincon	Burney Group	SC41-SC46	N323323	W1104766	14.4	B
Santa Rita	Duranium Claim	SR383	N314013	W1105045	14.4	B
Dragoon	Abril Mine	DR 151-167	N315434	W1095935	14.4	B
Santa Teresa	Cobre Grande Mine	ST1-ST18	N325835	W1101731	14.4	B
Dragoon	Christmas prospect	DR 297	N315208	W1095653	14.4	B
Whetstone	Copper Plate	WH103	N314604	W1102744	14.4	B
Chiricahua-Pedregosa Mtns.	Clair Group Mines	NONE	N320447	W1092005	14.4	B
Tumacacori	Arizona Blue Fire Opal	T904 - T908	N312923	W1111013	13.0	B
Tumacacori	Diablo Claims	T927 - T932	N313809	W1110809	13.0	B
Santa Catalina-Rincon	Burney Group	SC39	N323313	W1104742	13.0	B
Santa Rita	Unnamed workings	SR507-509	N313754	W1105158	13.0	B
Santa Teresa	Unnamed open cut	ST 41-42	N325224	W1101835	12.5	B

Unit (Mountain Range)	IAMLS name	USBM sample #	Lat.	Long.	EH	EH category
Dragoon	St. Francis Mine	DR 130-149	N315738	W1095752	12.5	B
Dragoon	Jordan Canyon prospects	DR 51-75	N315923	W1100125	12.5	B
Galiuro	Gold Mountain Mine	GA 8-21	N323626	W1102037	12.5	B
Pinaleno-Greasewood Mtns.	President Mine	PI 6-8	N324345	W1100520	12.5	B
Pinaleno Greasewood Mtns.	Gold Gulch prospects	PI 21-38	N323750	W1095427	12.5	B
Santa Rita	Unnamed workings	SR384-389	N313955	W1105728	12.4	B
Canelo Hills-Patagonia Mountains	Hidden	PA106-115	N313052	W1104213	12.4	B
Santa Rita	Copper Mountain	SR847-851	N313736	W1104750	12.4	B
Santa Rita	Dragon Z Mine	SR806-820	N313638	W1104752	12.4	B
Tumacacori	Unnamed adit	T351, T352	N312734	W1111440	12.4	B
Huachuca	Unnamed adits	HU194-HU196	N312203	W1101826	12.4	B
Huachuca	Huachuca claims	HU087-HU089	N312533	W1101544	12.4	B
Santa Rita	Curtice Mine	SR58-63	N315101	W1104621	12.4	B
Santa Rita	Taylor Prospect	SR93-97	N315024	W1104520	12.4	B
Canelo Hills-Patagonia Mountains	Pollywog Group	PA536-538	N312436	W1104220	12.4	B
Santa Rita	Old Madera Mine	SR283-284	N314222	W1105131	12.4	B
Santa Rita	Gold Ledge	SR160-169	N314538	W1104650	12.4	B
Santa Rita	Gold Buck	SR173-182	N314528	W1104629	12.4	B
Santa Rita	Unnamed prospects	SR183-185	N314527	W1104554	12.4	B
Santa Rita	Royal Mountain Mine	SR205-210	N314506	W1104630	12.4	B
Santa Rita	Unnamed workings	SR218-224	N314455	W1104945	12.4	B
Santa Rita	Aliso Springs Prospect	SR225-228	N314410	W1104758	12.4	B
Santa Rita	Unnamed workings	SR932-934	N313715	W1105028	12.4	B
Santa Rita	Silver Cane	SR840-846	N313730	W1104730	12.4	B
Santa Rita	Unnamed workings	SR746-748	N313418	W1104718	12.4	B
Santa Rita	Zeckendorf	SR191, 192	N314538	W1104558	12.4	B
Santa Rita	Silver Leaf	SR186-190	N314528	W1104558	12.4	B
Santa Rita	Keith	SR154-158	N314542	W1104644	12.4	B
Santa Rita	Unnamed prospect	SR152, 153	N314554	W1104635	12.4	B
Canelo Hills-Patagonia Mountains	May	PA602	N312458	W1104602	12.4	B
Santa Rita	Unnamed prospects	SR140-142	N314634	W1104719	12.4	B
Canelo Hills-Patagonia Mountains	Four Metals Mine	PA542-563	N312353	W1104413	12.4	B
Tumacacori	Unnamed working	T739 - T741	N312444	W1111449	12.4	B
Santa Catalina-Rincon	Unnamed working	SC8	N323255	W1104759	12.4	B
Santa Catalina-Rincon	Unnamed workings	SC70-SC79	N323300	W1104711	12.4	B
Santa Catalina-Rincon	Little Hill	SC53-SC60	N323235	W1104711	12.4	B
Santa Catalina-Rincon	Unnamed workings	SC114-SC118	N323432	W1104352	12.4	B
Santa Catalina-Rincon	Unnamed workings	SC134, SC135	N323337	W1104510	12.4	B
Tumacacori	Unnamed workings	T122 - T128	N313201	W1112042	12.4	B
Santa Catalina-Rincon	Suena del Oro	SC112, SC113	N323354	W1104349	12.4	B
Huachuca	Unnamed workings	HU135-HU137	N312222	W1101654	12.4	B
Huachuca	Unnamed workings	HU126-HU128	N312230	W1101539	12.4	B
Tumacacori	Brouse and vicinity	T29 - T33	N313142	W1112416	12.4	B
Tumacacori	Arrieta vicinity	T9-13, 16, 17	N313032	W1112449	12.4	B

Unit (Mountain Range)	IAMLS name	USBM sample #	Lat.	Long.	EH	EH category
Huachuca	Unnamed adit	HU191-HU193	N312152	W1101748	12.4	B
Tumacacori	Unnamed workings	T934 - T939	N313313	W1110505	12.4	B
Huachuca	Unnamed workings	HU081-HU086	N312546	W1101536	12.4	B
Tumacacori	Unnamed adit	T768, T769	N312239	W1110552	12.4	B
Santa Catalina-Rincon	Pima Joe claim #1	SC110, SC111	N323406	W1104407	12.4	B
Tumacacori	Unnamed workings	T743 - T749	N312411	W1111546	12.4	B
Tumacacori	Black Copper Queen	T623 - T628	N312454	W1111559	12.4	B
Tumacacori	Unnamed adit	T708	N312509	W1111434	12.4	B
Peloncillo	Silver Tip Mine	PE 4-19	N312854	W1090323	12.4	B
Tumacacori	Unnamed workings	T725 - T727	N312457	W1111446	12.4	B
Tumacacori	Unnamed adit	T705 - T707	N312501	W1111452	12.4	B
Tumacacori	Unnamed workings	T576 - T578	N312508	W1111455	12.4	B
Whetstone	Unnamed workings	WH2, WH3	N315221	W1102412	12.4	B
Tumacacori	Unnamed adit	T629 - T631	N312453	W1111547	12.4	B
Tumacacori	Unnamed workings	T652	N312503	W1111528	12.4	B
Tumacacori	Unnamed workings	T616 - T618	N312506	W1111548	12.4	B
Tumacacori	Unnamed working	T633 - T635	N312451	W1111542	12.4	B
Tumacacori	Unnamed workings	T689, T690	N312436	W1111527	12.4	B
Tumacacori	Stymie Owl Group	T1 - T3	N312654	W1112536	12.4	B
Tumacacori	Unnamed workings	T283 - T288	N312755	W1111536	12.4	B
Tumacacori	Unnamed workings	T292 - T294	N312752	W1111534	12.4	B
Tumacacori	Unnamed workings	T866 - T869	N312148	W1110823	12.4	B
Tumacacori	Unnamed adit	T235	N312814	W1111655	12.4	B
Santa Catalina-Rincon	Unnamed adit	SC142, SC143	N323334	W1104405	12.4	B
Tumacacori	Unnamed workings	T876, T877	N312332	W1110837	12.4	B
Tumacacori	Unnamed workings	T878, T879	N322315	W1110829	12.4	B
Tumacacori	Jarillas	T161 - T165	N313020	W1112036	12.4	B
Tumacacori	Easter Mine Group	T18 - T28	N313053	W1112400	12.4	B
Tumacacori	Unnamed workings	T34 - T44	N313251	W1112339	12.4	B
Tumacacori	Unnamed workings	T555 - T557	N312527	W1111527	12.4	B
Tumacacori	Hole-in-the-Rock	T154 - T158	N313133	W1112032	12.4	B
Tumacacori	Contact	T135, T136	N313158	W1112020	12.4	B
Tumacacori	Unnamed workings	T583 - T588	N312530	W1111430	12.4	B
Tumacacori	Unnamed workings	T721 - T724	N312506	W1111415	12.4	B
Tumacacori	Unnamed workings	T559 - T569	N312518	W1111524	12.4	B
Santa Rita	Unnamed workings	SR733-745	N313408	W1104655	12.4	B
Santa Rita	Los Burritos Prospect	SR821	N313628	W1104725	12.4	B
Santa Rita	Unnamed workings	SR822-839	N313000	W1104740	12.4	B
Santa Rita	Star Pointer Mine	SR272-273	N314619	W1105111	12.4	B
Santa Rita	Sun Lode Group	SR278	N314413	W1105254	12.4	B
Santa Rita	Santa Rita Group	SR104-107	N315003	W1004518	12.4	B
Santa Rita	Plata Cascabel	SR136-138	N314648	W1104639	12.4	B
Santa Rita	Old Tucson Mine area	SR199-201	N314528	W1104532	12.4	B
Santa Rita	Unnamed working	SR305	N314159	W1105306	12.4	B

Unit (Mountain Range)	IAMLS name	USBM sample #	Lat.	Long.	EH	EH category
Santa Rita	Spear Prospect	SR295	N314200	W1105231	12.4	B
Santa Rita	Blacksmith Prospect	SR308-310	N314201	W1105332	12.4	B
Santa Rita	Hermits Home Mine	SR311-314	N314208	W1105346	12.4	B
Santa Rita	Unnamed working	SR356, 357	N314203	W1105612	12.4	B
Santa Rita	Jenkins Prospect?	SR361, 362	N314135	W1105436	12.4	B
Santa Rita	Unnamed workings	SR401-404	N314042	W1105546	12.4	B
Santa Rita	Unnamed prospect	SR125	N314809	W1104558	12.4	B
Santa Rita	Old Baldy Prospect	SR280	N314258	W1105208	12.4	B
Santa Rita	Florida Mine area	SR271	N314452	W1105015	12.4	B
Santa Rita	Unnamed workings	SR926-930	N313710	W1104985	12.4	B
Santa Rita	Walden Mine	SR948-950	N314015	W1105000	12.4	B
Tumacacori	Unnamed working	T175 - T180	N313016	W1111937	12.4	B
Tumacacori	Unnamed workings	T859 - T861	N312225	W1110730	12.4	B
Tumacacori	Unnamed Workings	T856, T857	N312209	W1110709	12.4	B
Tumacacori	Unnamed working	T909 - T926	N313357	W1111149	12.4	B
Canelo Hills-Patagonia Mountains	Candelerio Peak	PA3-4	N313316	W1103937	12.4	B
Tumacacori	Unnamed shaft	T862	N312208	W1110738	12.4	B
Canelo Hills-Patagonia Mountains	Sulphide Mine	PA68, 69	N313043	W1103600	12.4	B
Huachuca	Oversite	HU212-HU216	N312349	W1101854	12.4	B
Whetstone	David Lee	WH98-WH100	N314558	W1102521	12.4	B
Santa Rita	Unnamed working	SR1	N315455	W1104515	12.4	B
Santa Rita	Unnamed workings	SR2-8	N315455	W1104450	12.4	B
Santa Rita	Friez Prospect	SR151	N314702	W1104602	12.4	B
Canelo Hills-Patagonia Mountains	Copper Mountain	PA16, 17	N313257	W1103808	12.4	B
Santa Rita	Unnamed workings	SR716, 717	N313335	W1104745	12.4	B
Santa Catalina-Rincon	Unnamed Workings	SC158, SC159	N323321	W1104348	10.8	B
Dragoon	Garden Spring prospects	DR 449-460	N315107	W1095826	10.4	B
Santa Catalina-Rincon	Colden Contract	SC124	N323420	W1104306	10.4	B
Santa Catalina-Rincon	Unnamed adit	SC225-SC227	N322833	W1104332	10.4	B
Santa Rita	Go Devil Group	SR391-400	N314010	W1105628	10.4	B
Santa Rita	Merchant Mine	SR98-102	N315018	W1104524	10.4	B
Santa Rita	Unnamed workings	SR115-117	N314907	W1104557	10.4	B
Santa Rita	Last Chance	SR109-110	N314945	W1104554	10.4	B
Santa Rita	Unnamed Workings	SR24-31	N315315	W1104634	10.4	B
Tumacacori	Unnamed workings	T940 - T942	N313132	W1110644	10.4	B
Dragoon	Unnamed Workings	DR 335-341	N315107	W1095649	10.4	B
Dragoon	"The pit" prospect	DR 262-268	N315256	W1095707	10.4	B
Dragoon	Unnamed shafts	DR 329-334	N315117	W1095647	10.4	B
Santa Catalina-Rincon	Unnamed Workings	SC163	N323307	W1104323	10.4	B
Santa Catalina-Rincon	Unnamed adit	SC186-SC188	N323220	W1104438	10.4	B
Santa Catalina-Rincon	Unnamed adit	SC201, SC202	N323141	W1104239	10.4	B
Chiricahua-Pedregosa Mtns.	Blacksmith West	CH 25-26	N315921	W1091715	10.4	B
Whetstone	Unnamed working	WH15, WH16	N315301	W1102147	10.4	B
Chiricahua-Pedregosa Mtns.	Unnamed adits	CH 11-22	N315935	W1091717	10.4	B

Unit (Mountain Range)	IAMLS name	USBM sample #	Lat.	Long.	EH	EH category
Chiricahua-Pedregosa Mtns.	Unnamed shaft and prospects	CH 202-205	N315604	W1091105	10.4	B
Dragoon	Unnamed workings	DR 442-448	N314910	W1095617	10.4	B
Chiricahua-Pedregosa Mtns.	Unnamed workings	CH 177-194	N315636	W1091328	10.4	B
Dragoon	Sala Ranch prospects	DR 461-477	N315241	W1095952	10.4	B
Pinaleno-Greasewood Mtns.	Unnamed shaft	PI 47	N322730	W1094916	10.4	B
Santa Rita	Billey Sunday Prospect	SR250-254	N314330	W1104520	10.4	B
Santa Rita	Agua Caliente Caves	SR365-368	N314115	W1105731	10.4	B
Santa Rita	Unnamed workings	SR369, 370	N314052	W1105725	10.4	B
Santa Catalina-Rincon	Golden Earth & vicinity	SC125-SC128	N323402	W1104238	10.4	B
Chiricahua-Pedregosa Mtns.	Grace Mine	CH 208-215	N315413	W1090739	10.4	B
Tumacacori	Unnamed workings	T873, T874	N312334	W1110812	10.4	B
Tumacacori	Unnamed workings	T750, T751	N312406	W1111500	10.4	B
Chiricahua-Pedregosa Mtns.	Unnamed prospect	CH 76-77	N315630	W1091617	10.4	B
Pinaleno-Greasewood Mtns.	Unnamed adit	PI 57-60	N323507	W1094547	10.4	B
Santa Rita	Daniels Mine	SR279	N314330	W1105212	10.4	B
Santa Rita	Unnamed working	SR211-215	N314518	W1104851	10.4	B
Santa Rita	Unnamed workings	SR936, 937	N313728	W1105053	10.4	B
Tumacacori	Unnamed outcrop	T735 - T738	N312447	W1112449	10.4	B
Tumacacori	Unnamed prospects	T772 - T774	N312240	W1110541	10.4	B
Huachuca	Joe Bailey prospect & vicinity	HU009, HU010	N312928	W1102621	10.4	B
Tumacacori	Loma de Manganese	T322	N312714	W1111504	10.4	B
Santa Catalina-Rincon	Unnamed adits	SC198, SC199	N323137	W1104439	10.4	B
Santa Catalina-Rincon	Unnamed workings	SC84-SC86	N323418	W1104721	10.4	B
Santa Catalina-Rincon	Unnamed working	SC17	N323248	W1104739	10.4	B
Huachuca	Unnamed working	HU134	N312204	W1101558	10.4	B
Whetstone	Unnamed working	WH4, WH5	N315341	W1102418	10.4	B
Huachuca	Thomas Tungsten claims	HU062, HU063	N312730	W1101858	10.4	B
Santa Teresa	Unnamed prospects	ST 49-50	N325151	W1101730	10.4	B
Tumacacori	Unnamed working	T758	N312331	W1111528	10.4	B
Tumacacori	Unnamed prospect	T784	N312204	W1110627	10.4	B
Tumacacori	Unnamed working	T632	N312450	W1111546	10.4	B
Tumacacori	Unnamed working	T650	N312458	W1111529	10.4	B
Santa Rita	Unnamed workings	SR216, 217	N314612	W1105001	10.4	B
Huachuca	Unnamed adit	HU026, HU027	N312608	W1102225	10.4	B
Whetstone	Unnamed adit	WH86, WH87	N314611	W1102523	10.4	B
Huachuca	Unnamed adit	HU190	N312133	W1101726	10.4	B
Galiuro	Sixteen-to-One Mine	NONE	N323421	W1102253	10.4	B
Chiricahua-Pedregosa Mtns.	Unnamed adit	CH 52-55	N315923	W1091551	10.4	B
Whetstone	Unnamed adit	WH85	N314612	W1102538	10.4	B
Chiricahua-Pedregosa Mtns.	Unnamed adit	CH 56-58	N315925	W1091547	10.4	B
Santa Teresa	Fisher prospects	ST 20-34	N325619	W1101355	10.4	B
Santa Rita	Unnamed working	SR947	N313935	W1104810	10.4	B
Santa Rita	Wildcat Mine	SR951-954	N313953	W1105036	10.4	B
Chiricahua-Pedregosa Mtns.	Unnamed adit, shaft	CH 79-83	N315627	W1091436	10.4	B

Unit (Mountain Range)	IAMLS name	USBM sample #	Lat.	Long.	EH	EH category
Galiuro	Jackson Mine & vicinity	NONE	N322948	W1101849	10.4	B
Pinaleno-Greasewood Mtns.	Unnamed adit	PI 1	N324457	W1100649	10.4	B
Chiricahua-Pedregosa Mtns.	Unnamed adit, decline	CH 33-37	N315920	W1091608	10.4	B
Chiricahua-Pedregosa Mtns.	Black Queen Mine	CH 195-198	N315622	W1091137	08.7	B
Dragoon	Emma Adit/unnamed adit	DR 271-275	N315244	W1095711	08.7	B
Pinaleno-Greasewood Mtns.	Unnamed prospects	PI 49-51	N322827	W1094437	08.7	B
Chiricahua-Pedregosa Mtns.	Unnamed adits	CH 123-133	N315722	W1091454	08.7	B
Chiricahua-Pedregosa Mtns.	Rieder Tunnel	CH 38-44	N315920	W1091558	08.7	B
Pinaleno-Greasewood Mtns.	Unnamed shaft	PI 39-40	N323545	W1095230	08.7	B
Dragoon	Ella prospect	DR 256-258	N315312	W1095732	08.7	B
Santa Teresa	Unnamed prospect	ST 48	N325154	W1101716	08.7	B
Tumacacori	Unnamed prospect	T349	N312729	W1111450	08.6	B
Santa Catalina-Rincon	Unnamed workings	SC229	N322834	W1104317	08.6	B
Chiricahua-Pedregosa Mtns.	Unnamed shaft, decline	CH 206-207	N315601	W1091033	08.6	B
Tumacacori	Unnamed shaft	T46, T47	N313259	W1112035	08.6	B
Santa Catalina-Rincon	Unnamed workings	SC216-SC223	N322853	W1104528	08.6	B
Whetstone	Unnamed working	WH102	N312302	W1102454	08.6	B
Tumacacori	Unnamed working	T742	N312434	W1111449	08.6	B
Tumacacori	Argonaut Reefs	T378	N312640	W1111630	08.6	B
Tumacacori	Unnamed working	T693, T694	N312437	W1111502	08.6	B
Huachuca	Unnamed working	HU257	N312356	W1102134	08.6	B
Whetstone	Unnamed working	WH1	N315445	W1102641	08.6	B
Santa Catalina-Rincon	Unnamed working	SC120	N323439	W1104326	08.6	B
Santa Catalina-Rincon	Unnamed workings	SC67, SC68	N323307	W1104722	08.6	B
Huachuca	Pleasant View claims	HU064-HU071	N312726	W1101831	08.6	B
Santa Catalina-Rincon	Unnamed outcrop	SC181	N323219	W1104454	08.6	B
Santa Catalina-Rincon	Unnamed working	SC157	N323326	W1104352	08.6	B
Tumacacori	Unnamed workings	T695	N312435	W1111457	08.6	B
Dragoon	Unnamed adit	DR 345-347	N315101	W1095731	08.6	B
Dragoon	Unnamed adit	DR 177-184	N315331	W1095834	08.6	B
Santa Rita	Unnamed working	SR336-345	N314250	W1105648	08.6	B
Santa Rita	Blue Jay Prospect	SR676	N313416	W1104838	08.6	B
Tumacacori	Unnamed workings	T761, T762	N312242	W1110619	08.6	B
Huachuca	Unnamed workings	HU072-HU075	N312659	W1101702	08.6	B
Tumacacori	Unnamed working	T949	N312004	W1110328	08.6	B
Santa Catalina-Rincon	Unnamed adit	SC253	N322244	W1103416	08.6	B
Whetstone	Unnamed working	WH105	N315258	W1102648	08.6	B
Canelo Hills-Patagonia Mountains	RJ	PA67	N313038	W1103658	08.6	B
Chiricahua-Pedregosa Mtns.	Lead Lily Shaft	CH 23-24	N315932	W1091713	08.6	B
Whetstone	Unnamed workings	WH97	N314604	W1102443	07.2	B
Tumacacori	Unnamed outcrop	T944	N312440	W1110346	07.2	B
Tumacacori	Unnamed outcrop	T575	N312519	W1111459	07.2	B
Chiricahua-Pedregosa Mtns.	Unnamed shaft	CH 27	N315922	W1091732	07.2	B
Tumacacori	Unnamed outcrop	T946	N311951	W1110313	07.2	B

Unit (Mountain Range)	IMLS name	USBM sample #	Lat.	Long.	EH	EH category
Santa Catalina-Rincon	Unnamed working	SC69	N323249	W1104706	06.9	C
Whetstone	Unnamed workings	WH101	N314546	W1102518	06.9	C
Santa Rita	Greaterville Placers	NONE	N313238	W1104502	06.9	C
Canelo Hills-Patagonia Mountains	Bluebird Group	PA759-762	N312902	W1103128	06.2	C
Whetstone	James	WH29, WH30	N315021	W1102229	05.8	C
Tumacacori	Unnamed workings	T437, T438	N312621	W1111524	05.2	C
Santa Catalina-Rincon	Gold Hill	SC82, SC83	N323351	W1104721	04.0	C
Chiricahua-Pedregosa Mtns.	Unknown	CH 1-4	N320430	W1092154	03.5	C
Chiricahua-Pedregosa Mtns.	Unnamed decline, shaft	CH 161-162	N315630	W1091324	03.5	C
Whetstone	Lone Star	WH52	N314957	W1102203	03.4	C
Chiricahua-Pedregosa Mtns.	Chiricahua Mine	CH 87-92	N315713	W1091454	03.1	C
Tumacacori	Unnamed shafts	T211, T212	N312919	W1111904	02.1	C
Santa Catalina-Rincon	Unnamed working	SC182, SC183	N322228	W1104501	02.1	C
Santa Catalina-Rincon	Unnamed working	SC179, SC180	N323219	W1104504	02.1	C
Tumacacori	Unnamed workings	T395	N312652	W1111519	02.1	C
Tumacacori	Unnamed adit	T181 - T185	N313008	W1111920	02.1	C
Chiricahua-Pedregosa Mtns.	Unnamed prospects	CH 199-201	N315610	W1091126	01.7	C
Tumacacori	Unnamed shaft	T169	N313015	W1111940	01.7	C
Pinaleno-Greasewood Mtns.	Unnamed prospect	PI 64-65	N324150	W1094724	01.7	C
Tumacacori	Unnamed working	T654	N312506	W1111518	01.4	C
Dragoon	McDaniel's Cut prospect	DR 254-255	N315317	W1095739	01.4	C
Dragoon	Unnamed shaft	DR 269	N315248	W1095729	01.4	C
Dragoon	Unnamed shaft	DR 353	N315013	W1095642	01.4	C
Pinaleno-Greasewood Mtns.	Unnamed shaft	PI 56	N323006	W1094601	01.4	C

## **APPENDIX B**

### **TABLES OF NUMERICAL VALUES FOR SPECIFIC CHARACTERISTICS ON IAMLS**

**TABLES FROM USBM's**

**ABANDONED MINE LAND INVENTORY AND HAZARD EVALUATION HANDBOOK,**

**July 1993 draft version,**

**except for**

**Table "9", which was derived at USBM-IFOC specifically for analysis of  
Coronado National Forest**

## APPENDIX B.—HAZARD RANKING TABLES

**Table E-1.—Hazard values for commodities and materials**

Commodity	Human	Environmental	Source
Abrasive . . . . .	0	0	USBM <sup>1</sup>
Aluminum . . . . .	4	2	DOD <sup>2</sup>
Antimony . . . . .	7	1	DOD
Arsenic . . . . .	7	4	DOD
Asbestos . . . . .	6	1	DOD
Barium . . . . .	6	1	DOD
Beryllium . . . . .	2	2	USBM
Bismuth . . . . .	2	2	USBM
Boron . . . . .	2	3	DOD
Cadmium . . . . .	8	5	DOD
Calcium . . . . .	0	0	USBM
Cesium . . . . .	4	4	DOD
Chromite . . . . .	7	4	DOD
Chromium . . . . .	7	4	DOD
Cinders . . . . .	0	0	USBM
Clay . . . . .	0	0	USBM
Coal . . . . .	0	0	USBM
Cobalt . . . . .	8	2	DOD
Columbium . . . . .	2	2	USBM
Copper . . . . .	5	5	DOD
Cyanide . . . . .	2	5	DOD
Diatomite . . . . .	0	0	USBM
Feldspar . . . . .	0	0	USBM
Fluorine . . . . .	2	1	DOD
Gallium . . . . .	2	2	USBM
Gemstone . . . . .	0	0	USBM
Geothermal . . . . .	2	2	USBM
Gold . . . . .	2	2	USBM
Graphite . . . . .	0	0	USBM
Gypsum . . . . .	0	0	USBM
Hafnium . . . . .	2	2	USBM
Iridium . . . . .	2	2	USBM
Iron . . . . .	4	2	DOD
Kyanite . . . . .	0	0	USBM
Kyanite Gr . . . . .	0	0	USBM
Lathanium . . . . .	2	2	USBM
Lead . . . . .	8	5	DOD
Manganese . . . . .	3	3	USBM
Magnesium . . . . .	2	1	DOD
Mercury . . . . .	9	6	DOD
Mica . . . . .	0	0	USBM
Molybdenum . . . . .	2	2	USBM
Nickel . . . . .	7	5	DOD
Niobium . . . . .	2	2	USBM
Olivine . . . . .	0	0	USBM

Table E-1.—Hazard values for commodities and materials—Continued

<u>Commodity</u>	<u>Human</u>	<u>Environmental</u>	<u>Source</u>
Osmium . . . . .	2	2	USBM
Palladium . . . . .	2	2	USBM
Peat . . . . .	0	0	USBM
Perlite . . . . .	0	0	USBM
Petroleum . . . . .	2	2	USBM
Phosphate . . . . .	2	2	USBM
Platinum . . . . .	2	2	USBM
Platinum G . . . . .	2	2	USBM
Pumice . . . . .	0	0	USBM
Quartz cry . . . . .	0	0	USBM
Radium . . . . .	3	1	DOD
Rare Earth . . . . .	2	2	USBM
Rhenium . . . . .	2	2	USBM
Rhodium . . . . .	2	2	USBM
Ruthenium . . . . .	2	2	USBM
Sand and gravel . . . . .	0	0	USBM
Selenium . . . . .	6	4	DOD
Shale . . . . .	0	0	USBM
Silica . . . . .	0	0	USBM
Silicon . . . . .	0	0	USBM
Silver . . . . .	5	6	DOD
Sodium . . . . .	2	2	DOD
Stone . . . . .	0	0	USBM
Strontium . . . . .	3	1	DOD
Sulfate . . . . .	2	2	USBM
Sulfide . . . . .	2	2	USBM
Sulfur . . . . .	2	2	USBM
Talc . . . . .	0	0	USBM
Tantalum . . . . .	2	2	USBM
Tellurium . . . . .	2	2	USBM
Thallium . . . . .	7	3	DOD
Thorium . . . . .	2	2	USBM
Tin . . . . .	2	2	USBM
Titanium . . . . .	2	2	USBM
Tungsten . . . . .	2	2	USBM
Uranium . . . . .	4	1	DOD
Vanadium . . . . .	4	3	DOD
Zeolite . . . . .	0	0	USBM
Zinc . . . . .	5	4	DOD
Zirconium . . . . .	2	2	USBM

<sup>1</sup>U.S. Bureau of Mines, WFOC, determined.

<sup>2</sup>U.S. Department of Defense, Priority Model report.

Table E-2.—Status

<u>Code</u>	<u>Factor</u>
Past producer . . . . .	2
Developed deposit . . . . .	1.5
Explored prospect . . . . .	1.2
Raw prospect . . . . .	1
(No data) . . . . .	1

Table E-3.—Type (Property type)

<u>Code</u>	<u>Factor</u>
Surface . . . . .	1.2
Underground . . . . .	1.2
Surface-underground . . . . .	1.2
Mineral location . . . . .	1
Placer . . . . .	1
Unknown . . . . .	1
Well . . . . .	1
Processing plant . . . . .	1
(No data) <sup>1</sup> . . . . .	1

<sup>1</sup>For no data, suggest default equal factor of "1."

Table E-4.—Size

<u>Production, total based on size (metric tons)</u>	<u>Factor</u>
Small, 0-10,000 . . . . .	1.2
Small-Medium, > 10,000-250,000 . . . . .	1.4
Medium, > 250,000-500,000 . . . . .	1.6
Medium-Large, > 500,000 to 1 million . . . . .	1.8
Large, > 1 million . . . . .	2
(No data) <sup>1</sup> . . . . .	1

<sup>1</sup>For no data, suggest default equal factor of "1."

Table E-5.—Mill type

<u>Code</u>	<u>Factor</u>
Amalgamation . . . . .	2.2
Arrastre . . . . .	2.0
CIP . . . . .	2.2
Crusher (only) . . . . .	1
Cyanidation . . . . .	2.2
Flotation . . . . .	2.2
Gravity . . . . .	1.8
Heap leach . . . . .	2.2
Jig plant . . . . .	2
Leach . . . . .	2.2
Possible . . . . .	2
Retort . . . . .	2.2
Stamp . . . . .	2.1
Unknown/Possible . . . . .	2
(No mill) . . . . .	1

<sup>1</sup>When no indication of the presence of a mill, use default factor value equal to "1."

Table E-6.—Acid generating potential

<u>Code</u>	<u>Factor</u>
Yes . . . . .	1.2
No . . . . .	1

Table E-7.—Acid producers or indicator minerals

Arsenopyrite  
 Chalcopyrite  
 Galena  
 Iron oxide  
 Limonite  
 Marcasite  
 Pyrrhotite  
 Pyrite  
 Sphalerite  
 Stibnite  
 Sulfide

Table 9. - Access

	<u>Factor</u>
Maintained road	2
4WD to < $\frac{1}{2}$ mi of site	1.8
4WD, but > $\frac{1}{2}$ mi from site	1.4
trail or undrivable road	1.2
cross country	1
habitation < $\frac{1}{2}$ mi away	1.6

**APPENDIX C**

**ABANDONED MINE LAND INVENTORY AND INVESTIGATIONS  
DATA ENTRY FORM**

**U.S. BUREAU OF MINES - INTERMOUNTAIN FIELD OPERATIONS CENTER**

AML INVENTORY AND INVESTIGATION DATA ENTRY FORM  
US Bureau of Mines - IFOC

Management Unit: \_\_\_\_\_

Primary Name: \_\_\_\_\_

Alternate Name: \_\_\_\_\_

MASDB MILS Table Sequence number: \_\_\_\_\_

Date of Report: \_\_\_\_\_ Sample number(s): \_\_\_\_\_

**LOCATION DATA**

State: \_\_\_\_ County: \_\_\_\_\_ Township: \_\_\_\_ Range: \_\_\_\_ Section: \_\_\_\_

Latitude: \_\_\_\_\_ Longitude: \_\_\_\_\_ Elevation (ft): \_\_\_\_\_

7.5' or 15' Quadrangle Map Name: \_\_\_\_\_ Scale: \_\_\_\_\_

Mining or Mineral District: \_\_\_\_\_

**HISTORICAL DATA**

Please mark with an X all that apply.

Elements produced and/or noted in geochemical analyses:

Arsenic  Cadmium  Copper  Lead  Mercury  Zinc  Other

**Status of Operation:**

Past Producer  Explored Prospect  Raw Prospect  Developed Prospect

Status Unknown

**Type of Operation:**

Surface  Underground  Surface and Underground  Mineral Location

Placer  Prospect  Dredging  Processing Plant  Well  Unknown

No Data

**Size based on production of ore to date:**

Small (0 to 10,000 st)  Small to Medium (10,000 to 250,000 st)

Medium (250,000 to 500,000 st)  Medium to Large (500,000 to 1,000,000 st)   
Large (over 1,000,000 st)

**HISTORICAL DATA (con't)****Milling Method:**

Amalgamation  Arrastre  Gravity  Crusher only  Heap Leach   
Leach  CIP  Cyanidation  Stamp  Flotation   
Jig Plant  Retort  No Mill  Unknown

**Acid Producing or Indicating Minerals:**

Arsenopyrite  Chalcopyrite  Galena  Marcasite  Sphalerite   
Pyrite  Pyrrhotite  Stibnite  Other sulfide  Limonite   
Other FeOx

**Neutralizing Host Rock:**

Dolomite  Limestone  Marble  Micrite  Sparite   
Other Carbonate

**TYPE AND NUMBER OF WORKINGS**

(indicate with an X or 1, 2, etc.)

Adit  Decline  Shaft  Glory Hole  Small Pit or Trench (< 10 ft)   
Large Pit (> 10 ft)  Quarry  Placer  Building  Machinery   
Cistern  Solution Mining Well  Mine Dump  Mill Tailings   
Leach Pad  Highwall  Solution Pond  Ore Stockpile  Subsidence   
Other \_\_\_\_\_

**Condition of site and/or feature**

Does the condition of the feature represent a hazard? (y/n)

Mark all conditions that apply:

Open to Entry  Partly Caved  Concealed  Partly Concealed   
Collapsed  Partly Collapsed  Standing  Empty  Rotten Cribbing   
Unstable Wall  Eroded  Partly Eroded  Intact  Subsided   
Foundation  Prone to Wind Erosion  Other \_\_\_\_\_

**Size of Feature (ft)**

Length  x Width  x Height

**WATER**

Are bodies of water found on or near the site? (y/n) \_\_

Please mark with an X all that apply:

Stream  River  Pond  Intermittent Stream  Lake  Bay

Other \_\_\_\_\_

Is water present at the feature? (y/n) \_\_

Is water being produced from the feature? (y/n) \_\_

If water is present, how does it occur?:

Standing  Filled  Partly Filled  Flowing  Intermittent

If water is present, what color is it?:

Brown  Green  Yellow  Yellow/orange  Orange  Gray/black

Other color \_\_\_\_\_

**MACHINERY**

Is machinery present at the site? (y/n) \_\_

**Location of Machinery:**

Inside Building  Outside Building  No Building, Other Location

**Type of Machinery:**

Flotation Cell  Retort  Stamp Mill  Crusher  Ball or Rod Mill

Amalgamation Equipment  Arrastre  Ore Bins  Tanks  Other \_\_\_\_\_

**EXPLOSIVES**

Are any explosives or blasting supplies found on the site? (y/n) \_\_

If present, give type and location \_\_\_\_\_

**ACCESS**

Access is by:

Maintained Road  4WD Road to < 1/2 mi of site

4WD Road > 1/2 mi from site  Trail or undrivable Road  Cross-country

There is a habitation < 1/2 mi from the site (y/n) \_\_

## OTHER

Are any of the following other features present?:

Drums or Tanks  Headframes  Tramways  Bags  Scrap Metal   
 Trestles  Wooden Structures  Overhead Cables  Powerlines   
 Power Substations  Transformers  Chemicals  Other \_\_\_\_\_

## HAZARD CALCULATIONS

Environmental Hazard (EH):

- A = Commodity (Table E-1, Environmental column) produced historically or noted in analyses. Use the highest number for commodities noted.  
 B = Status (Table E-2).  
 C = Type (Table E-3).  
 D = Size (Table E-4).  
 E = Milling Method (Table E-5).  
 F = Acid potential: If any indicator minerals were checked AND neutralizing host rocks are not present, F = 1.2; otherwise F = 1.0

$${}^1\text{EH} = A \times B \times C \times D \times E \times F = \underline{\quad}$$

Human Hazard (HH):

- A = Commodity (Table E-1, Human column).  
 B = Status (Table E-2).  
 C = Type (Table E-3).  
 D = Size (Table E-4).  
 E = Milling Method (Table E-5).  
 F = Access (Table 9).

$${}^1\text{HH} = A \times B \times C \times D \times E \times F = \underline{\quad}$$

## PRIORITY

Sites will be ranked for each mountain range. The FS is presently under the gun on environmental hazards only. Numerical ranking will, therefore, be by EH as follows:

Category A: EH > 20

Category B: EH between 7 and 20

Category C: EH < 7

These are priority sites.  
 These sites should be examined in order of rank after category A is dealt with.  
 These sites may not need to be examined.

The category for this site is \_\_\_\_\_.

---

<sup>1</sup>Within a table, take only the highest value as the total value for that table.

## APPENDIX D

The following list of USBM reports was the starting point for analysis of potential environmental hazards at IAMLS in Coronado National Forest. They contain all the data available to USBM for the determination of which sites exceed a threshold level of potential environmental hazards. These reports, when completed, all will be distributed to appropriate Forest Service offices at the Washington and regional levels, and to the local Forest managers in Arizona.

### **REPORT LIST:**

Mineral appraisal of Coronado National Forest, part 1, Pinaleno-Greasewood Mountains Unit, Graham County, Arizona: U.S. Bureau of Mines Open-file Report MLA 8-93, by S. Don Brown.

Mineral appraisal of Coronado National Forest, part 2, Chiricahua-Pedregosa Mountains Unit, Cochise County, Arizona: U.S. Bureau of Mines Open-file Report MLA 12-93, by S. Don Brown.

Mineral appraisal of Coronado National Forest, part 3, Winchester Mountains Unit, Cochise County, Arizona: U.S. Bureau of Mines Open-file Report MLA 10-93, by Robert C. Armstrong and S. Don Brown.

Mineral appraisal of Coronado National Forest, part 4, Peloncillo Mountains Unit, Cochise County, Arizona, Hildago County, New Mexico: U.S. Bureau of Mines Open-file Report MLA 18-93, by Robert C. Armstrong.

Mineral appraisal of Coronado National Forest, part 5, Santa Catalina-Rincon Mountains Unit, Cochise, Pima, and Pinal Counties, Arizona: Manuscript in preparation; will be in U.S. Bureau of Mines Open-file MLA series.

Mineral appraisal of Coronado National Forest, part 6, Dragoon Mountains Unit, Cochise County, Arizona: In press; will be in U.S. Bureau of Mines Open-file MLA series, by Mark L. Chatman.

Mineral appraisal of Coronado National Forest, part 7, Canelo Hills-Patagonia Mountains Unit, Cochise and Santa Cruz Counties, Arizona: Manuscript in preparation; will be in U.S. Bureau of Mines Open-file MLA series.

Mineral appraisal of Coronado National Forest, part 8, Huachuca Mountains Unit, Cochise and Santa Cruz Counties, Arizona: Manuscript in preparation; will be in U.S. Bureau of Mines Open-file MLA series, by Robert C. Armstrong.

Mineral appraisal of Coronado National Forest, part 9, Galiuro Mountains Unit, Graham County, Arizona: U.S. Bureau of Mines Open-file Report MLA 21-93 (still in press), by S. Don Brown.

Mineral appraisal of Coronado National Forest, part 10, Santa Teresa Mountains Unit, Graham County, Arizona: U.S. Bureau of Mines Open-file Report MLA 26-93 (still in press), by S. Don Brown.

## **APPENDIX D--contin.**

Mineral appraisal of Coronado National Forest, part 11, Whetstone Mountains Unit, Cochise and Pima Counties, Arizona: Manuscript in preparation; will be in U.S. Bureau of Mines Open-file MLA series, by Mark L. Chatman.

Mineral appraisal of Coronado National Forest, part 12, Santa Rita Mountains Unit, Pima and Santa Cruz Counties, Arizona: Manuscript in preparation; will be in U.S. Bureau of Mines Open-file MLA series, by John R. McDonnell.

Mineral appraisal of Coronado National Forest, part 13, Atascosa-Pajarito-San Luis-Tumacacori Mountains Unit, Pima and Santa Cruz Counties, Arizona: Manuscript in preparation; will be in U.S. Bureau of Mines Open-file MLA series.